Figure 1

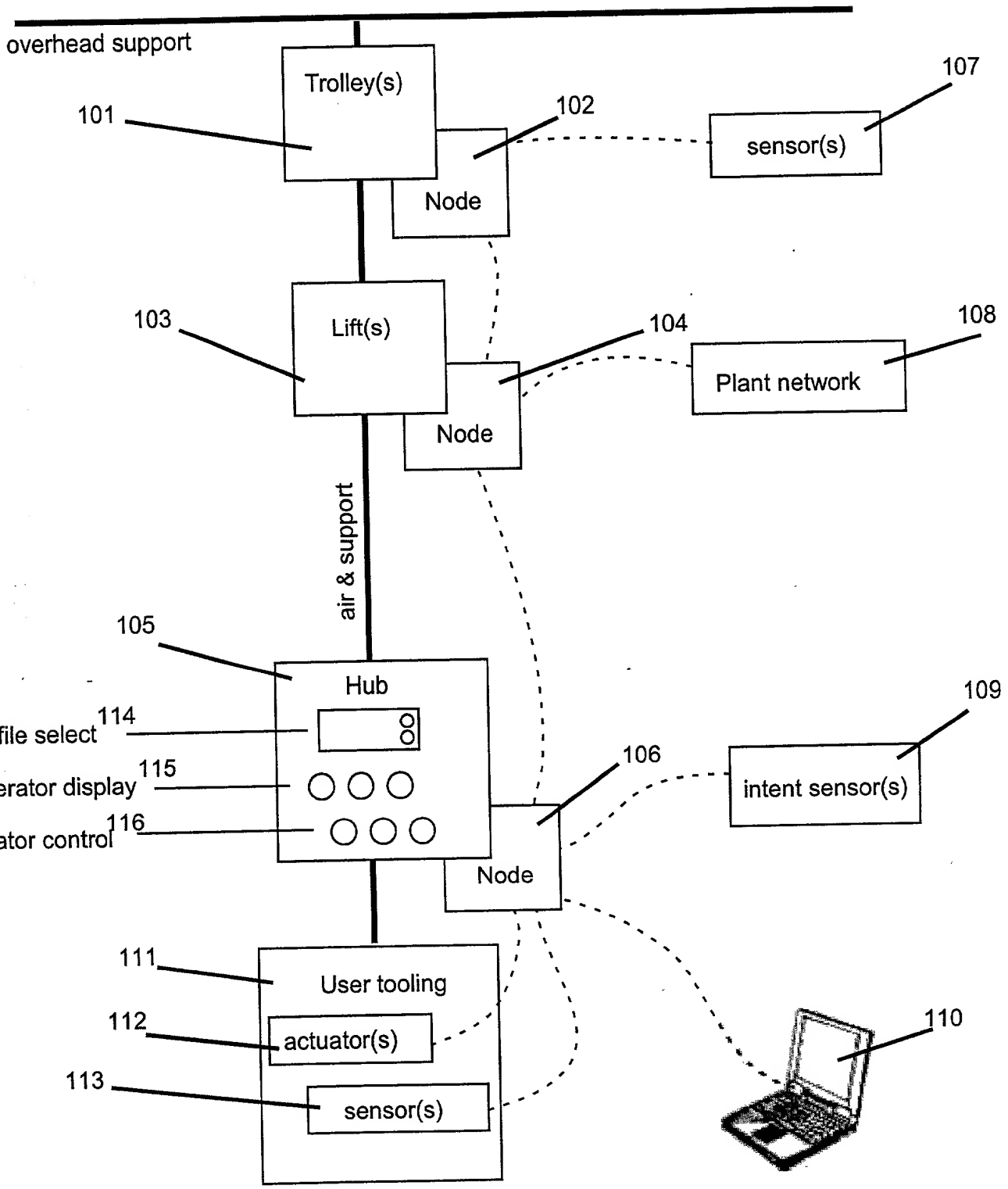
overhead support
Trolley(s)
101
102
107
sensor(s)
Node
Lift(s)
103
104
108
Plant network
Node
air & support
105
Hub
profile select
114
operator display
115
operator control
116
106
109
intent sensor(s)
Node
111
User tooling
112
actuator(s)
113
sensor(s)
110

Figure 2

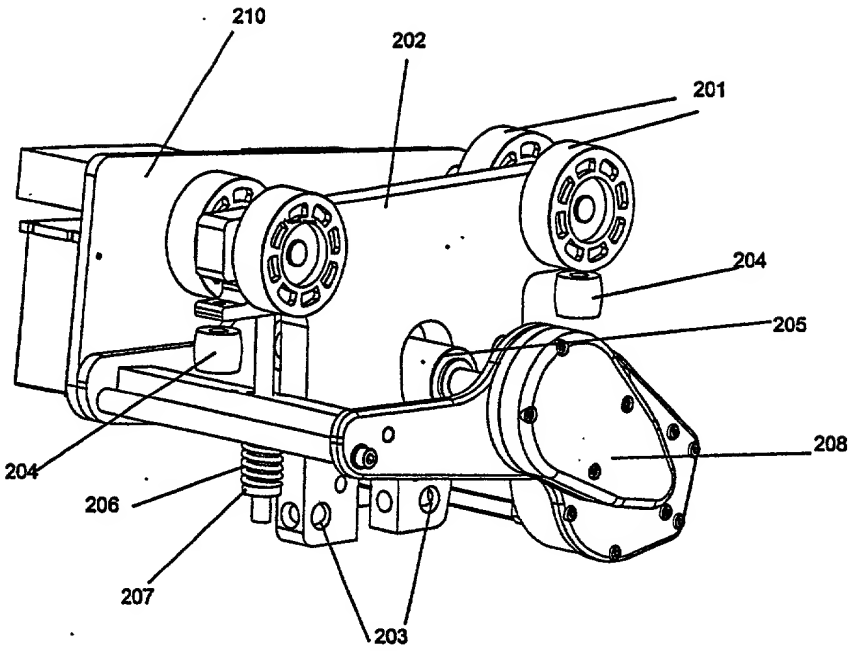

Figure 3

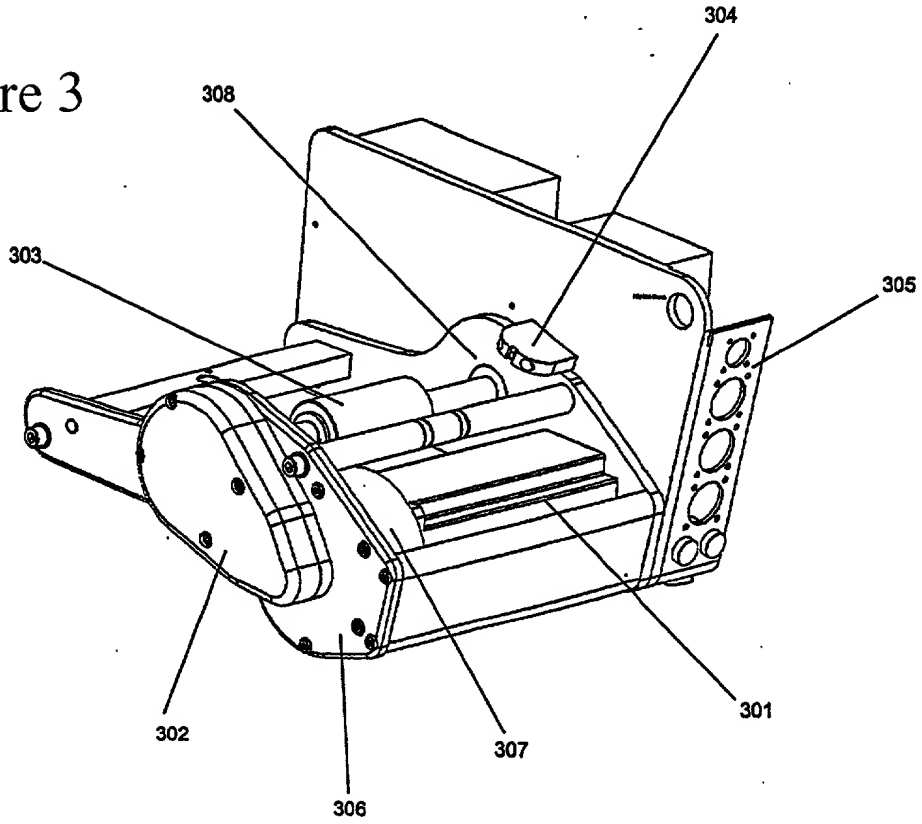

Figure 4

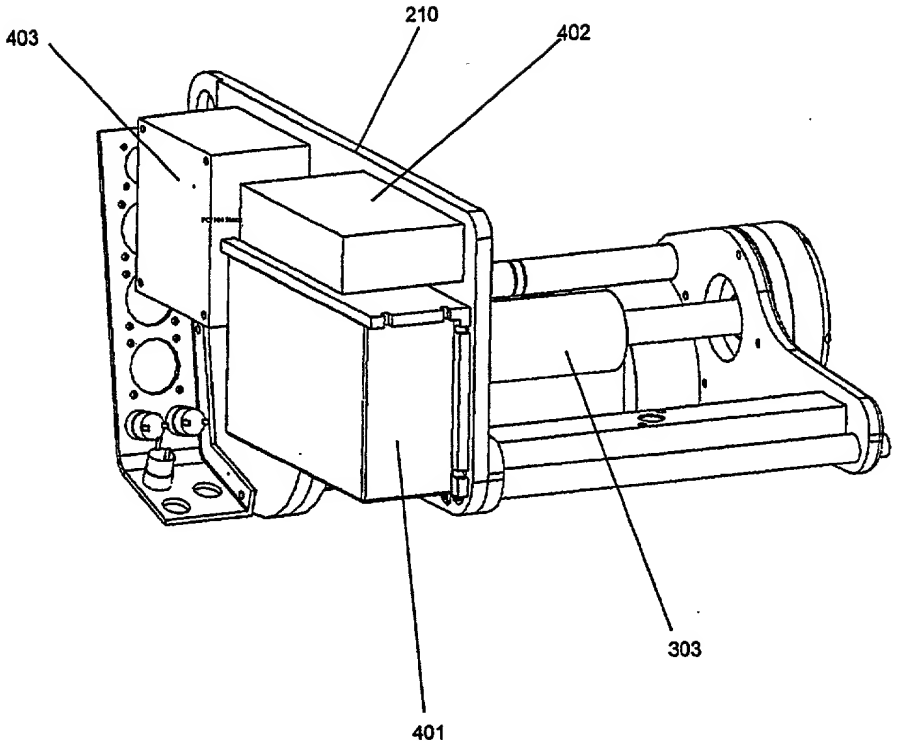

Figure 5

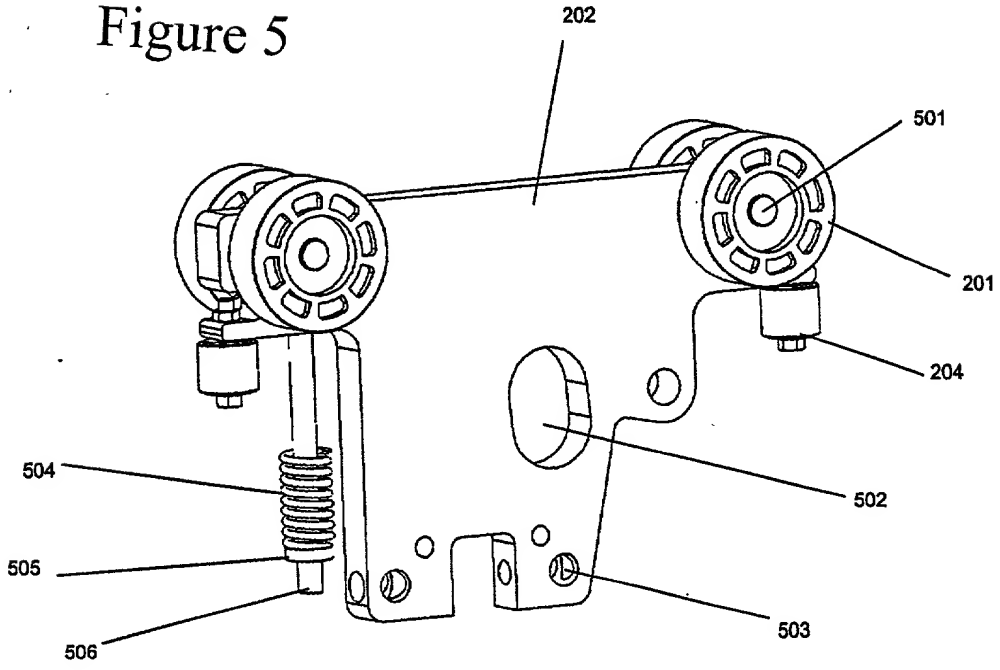

Figure 6

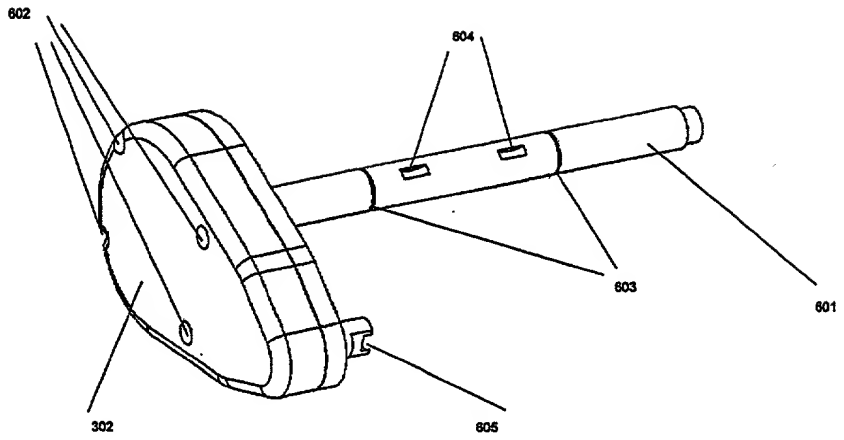

Figure 7

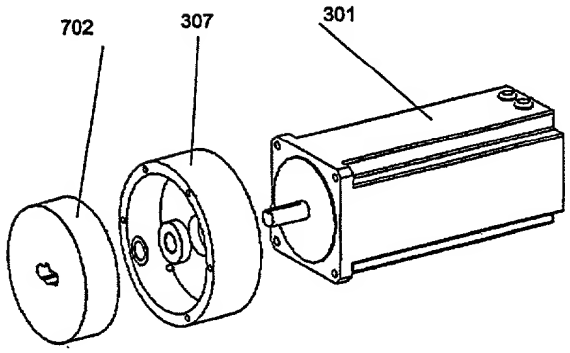

Figure 8

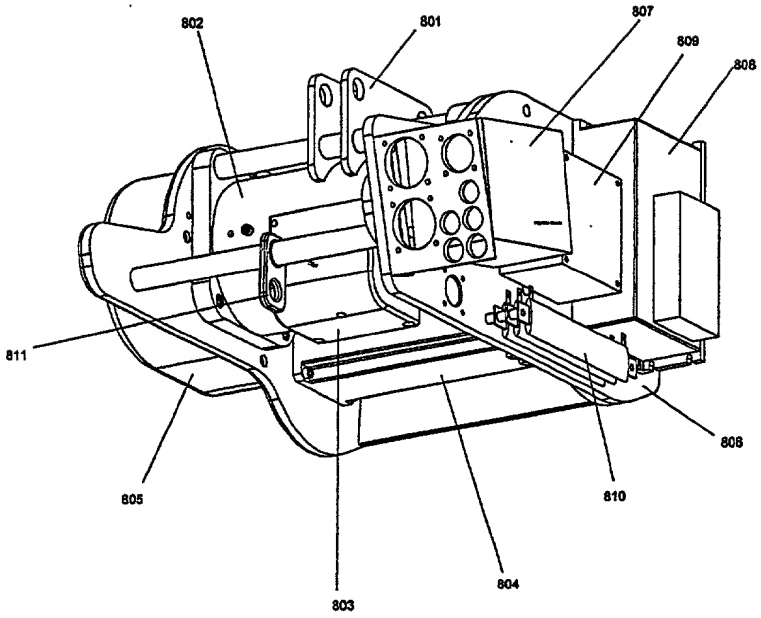

Figure 9

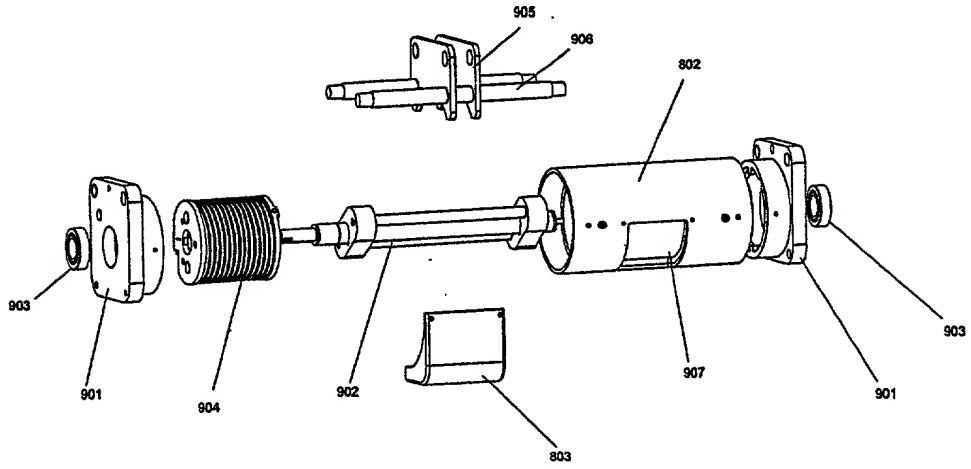

Figure 10

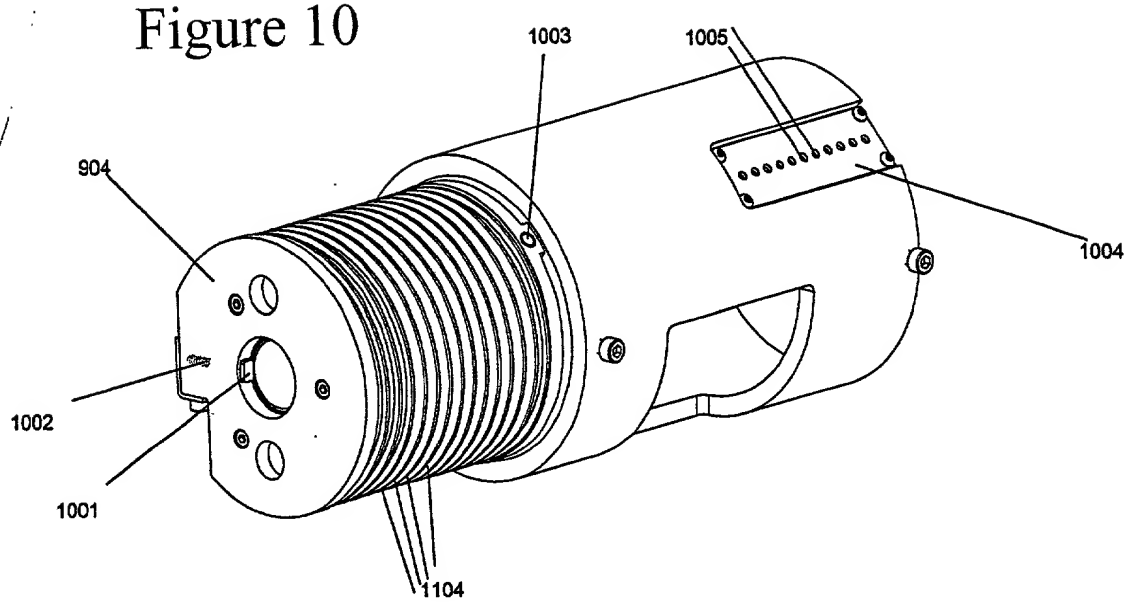

Figure 11

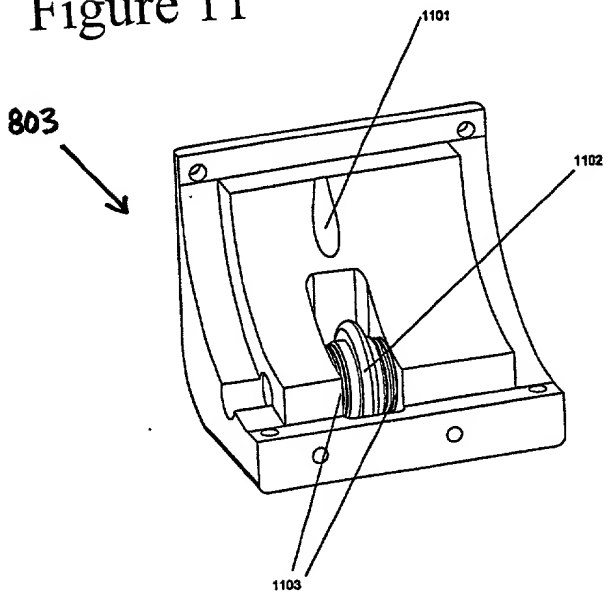

Figure 12

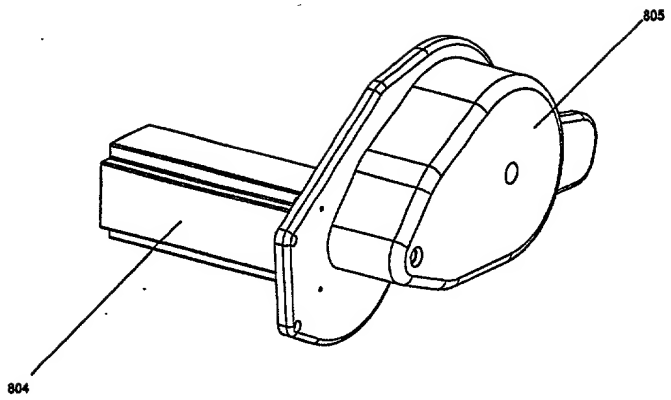

Figure 13

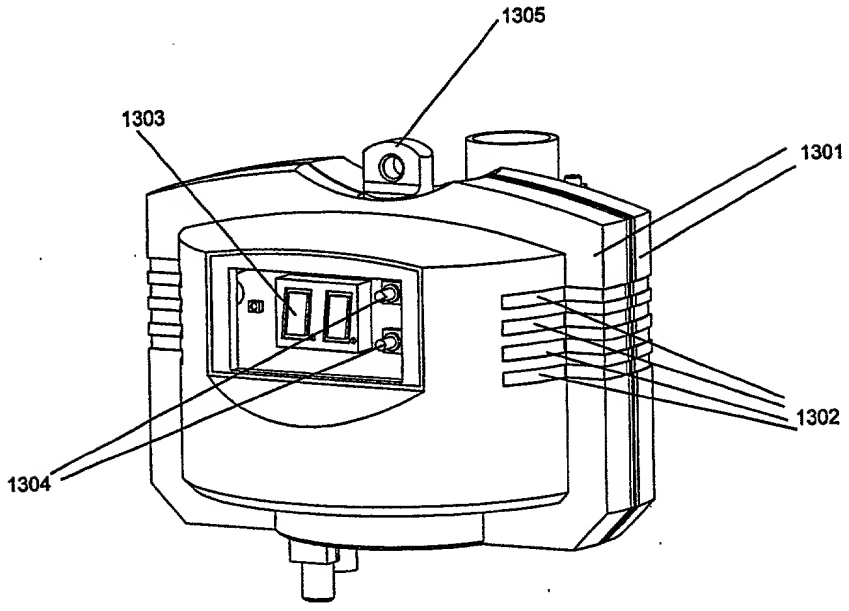

Figure 14

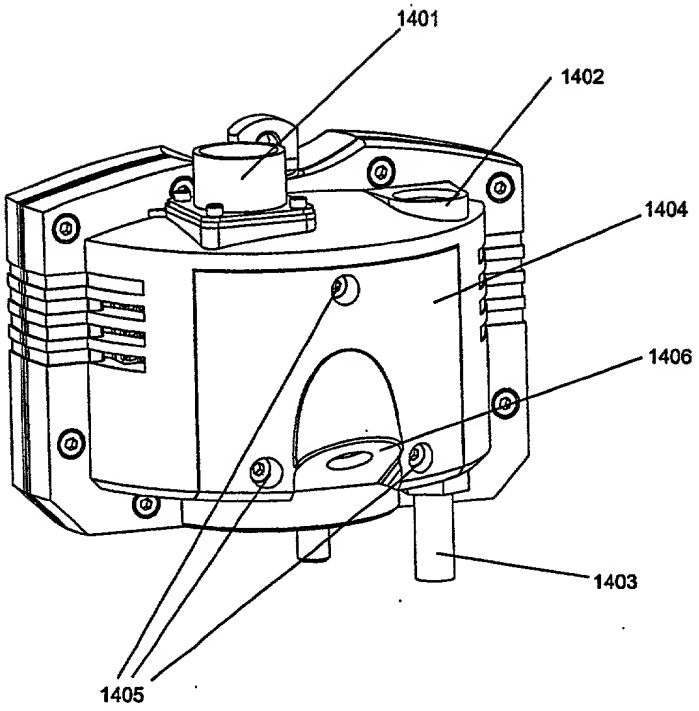

Figure 15

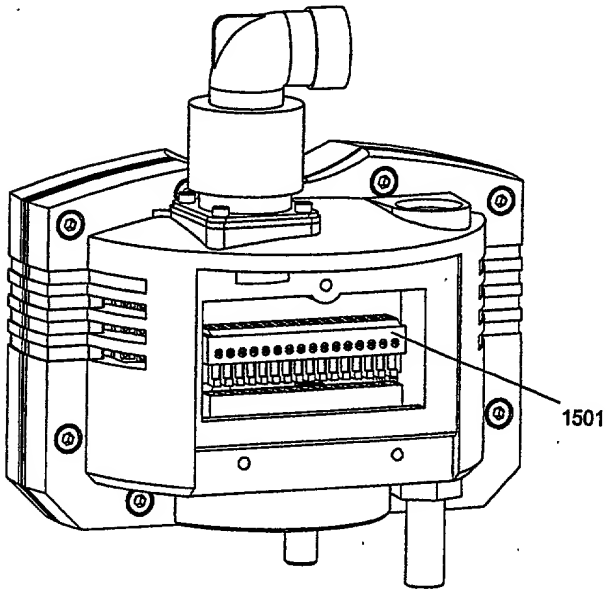

Figure 16

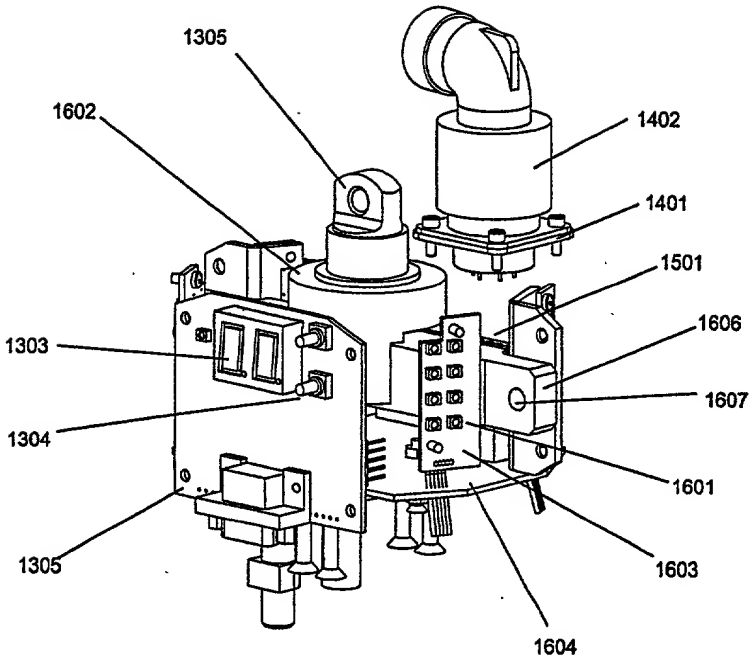

Figure 17

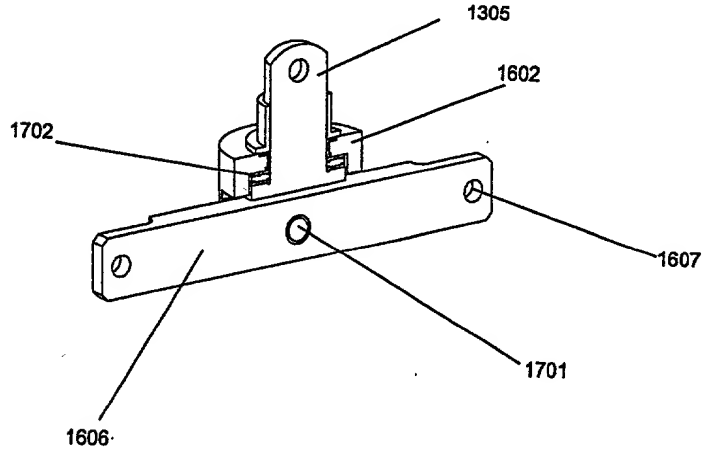

Figure 18

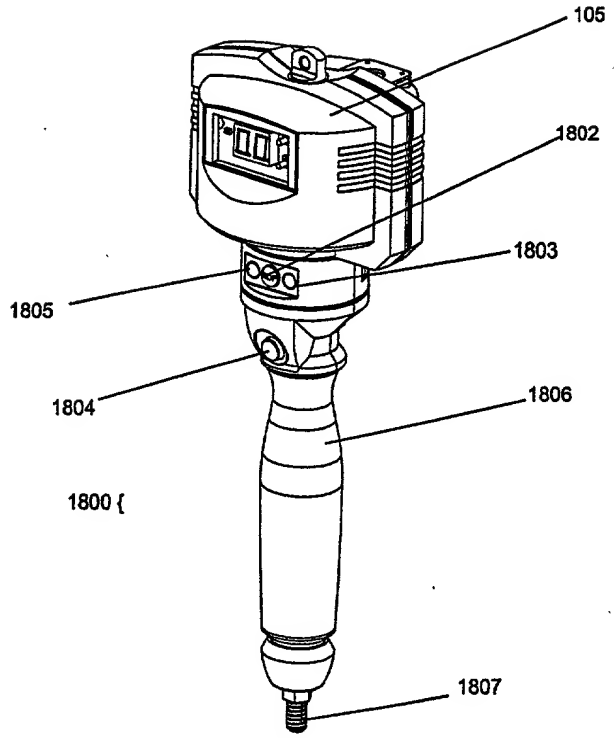

Figure 19

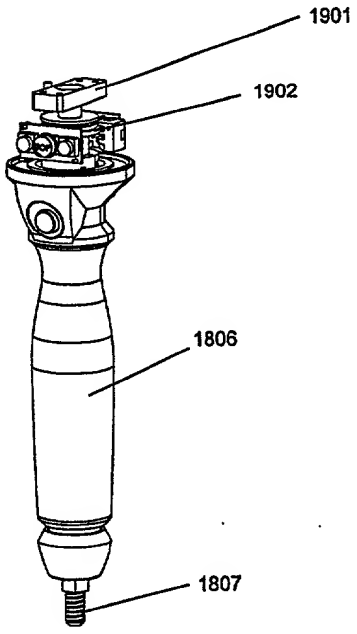

FIGURE 20a

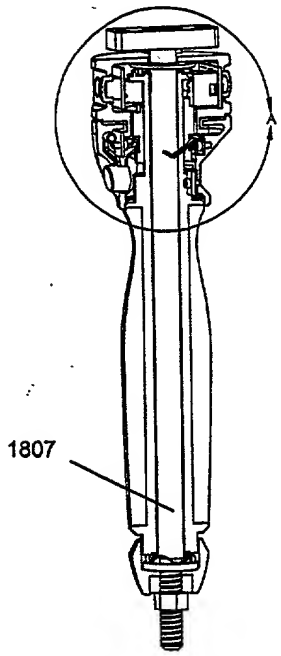

FIGURE 20b

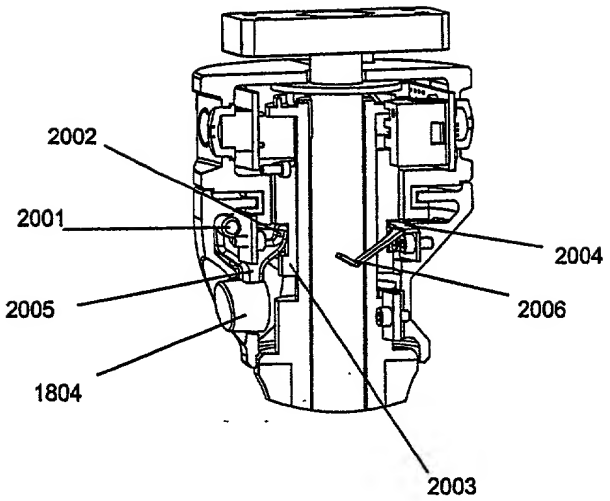

Figure 21

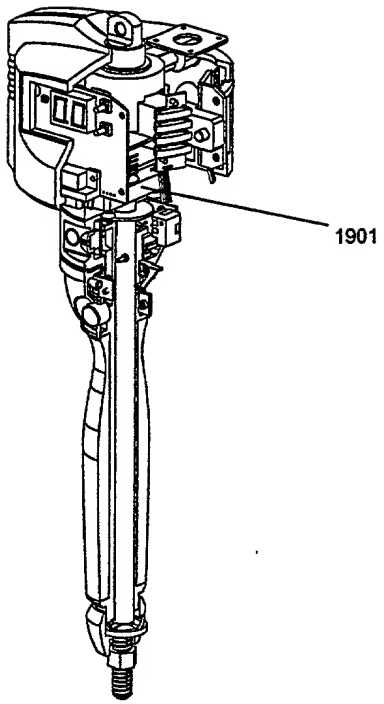

Figure 22

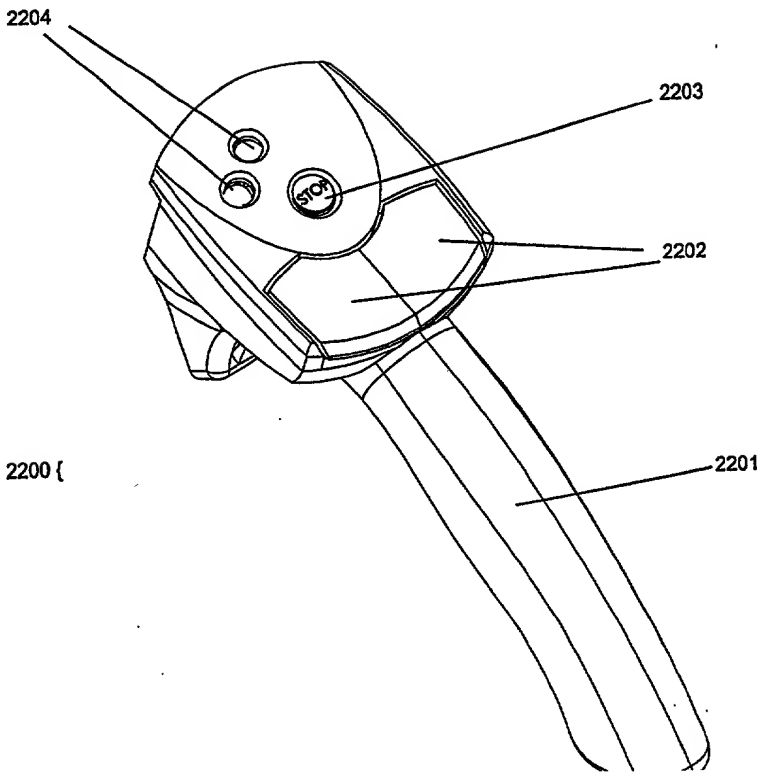

Figure 23

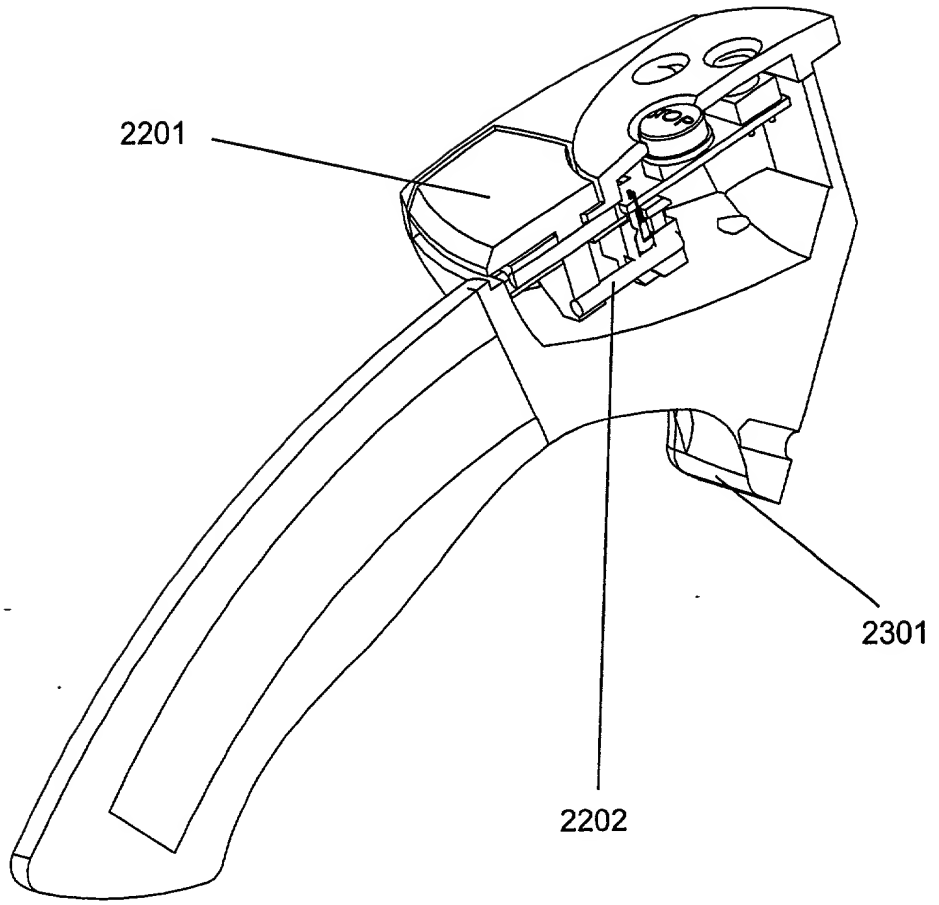

Figure 24

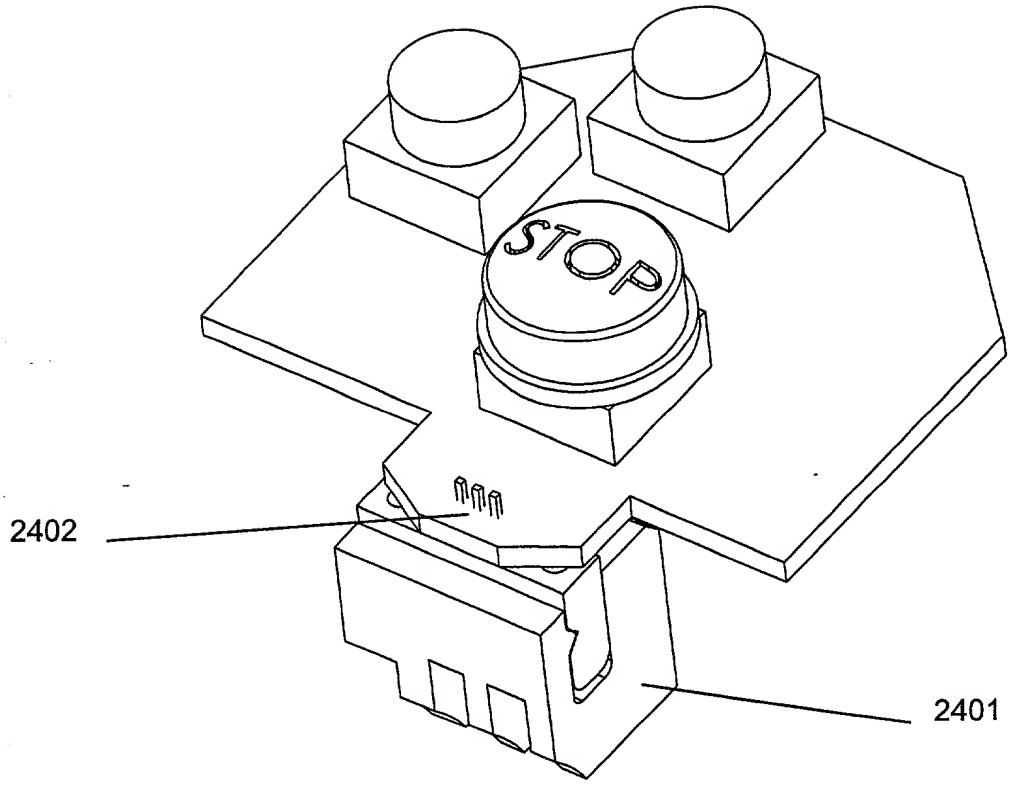

Figure 25

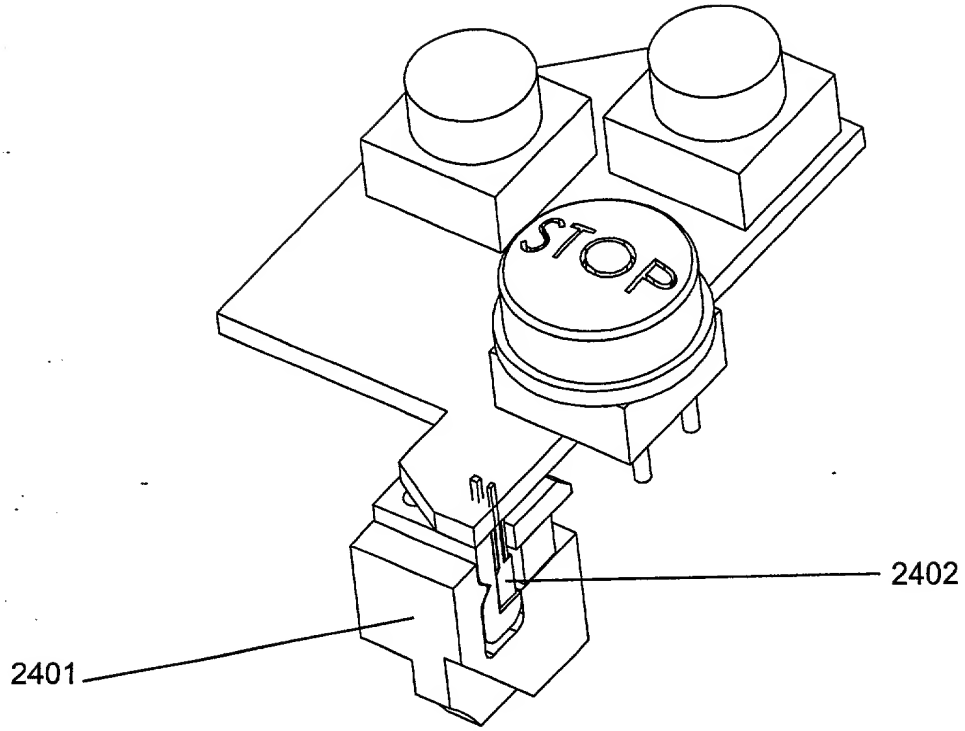

Figure 26

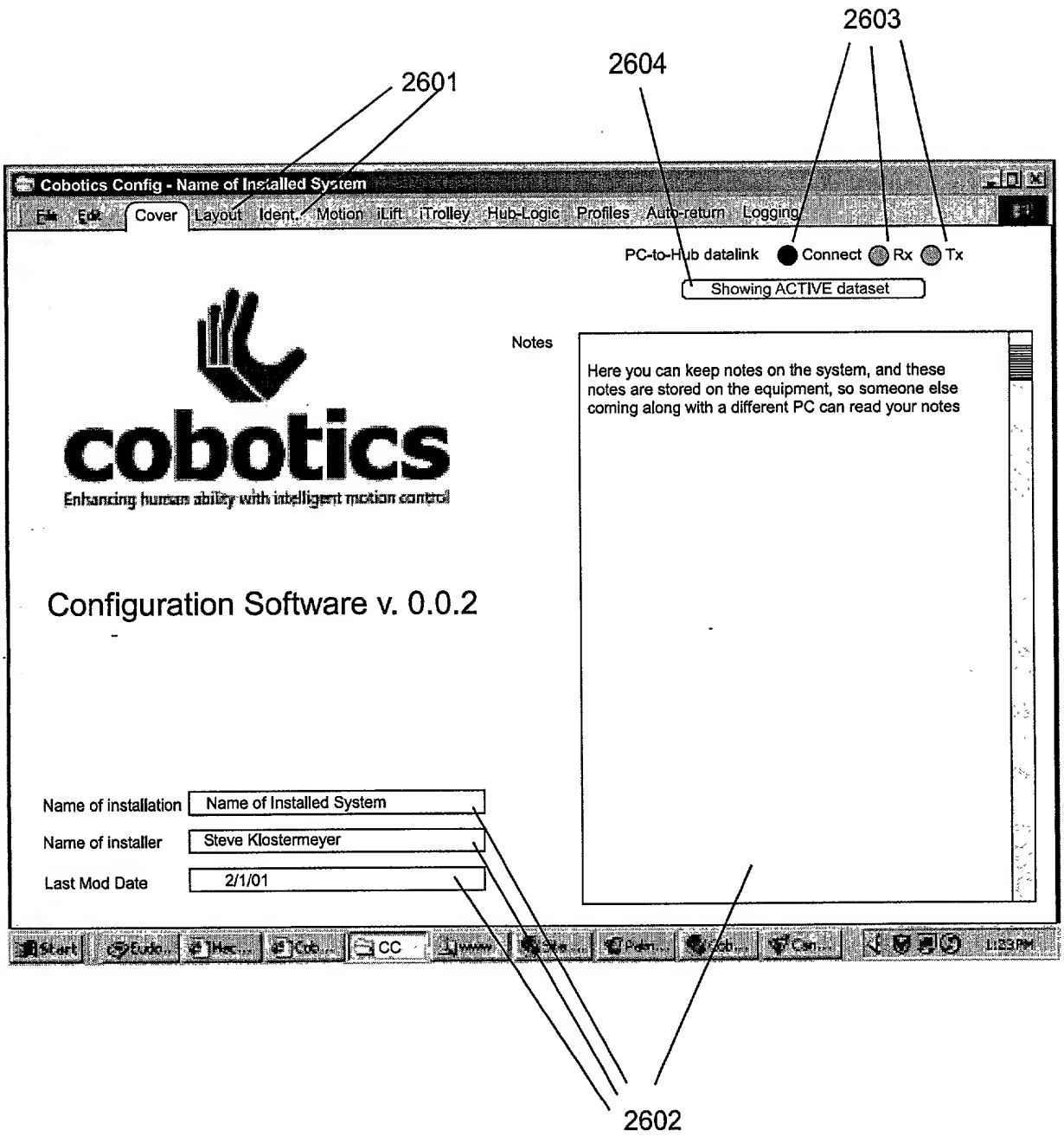
2603
2604
2601
Cobotics Config - Name of Installed System
File Edit Cover Layout Ident. Motion iLift iTrolley Hub-Logic Profiles Auto-return Logging
PC-to-Hub datalink Connect Rx Tx
Showing ACTIVE dataset
Notes
Here you can keep notes on the system, and these notes are stored on the equipment, so someone else coming along with a different PC can read your notes
cobotics
Enhancing human ability with intelligent motion control
Configuration Software v. 0.0.2
Name of installation Name of Installed System
Name of installer Steve Klostermeyer
Last Mod Date 2/1/01
2602

Figure 27

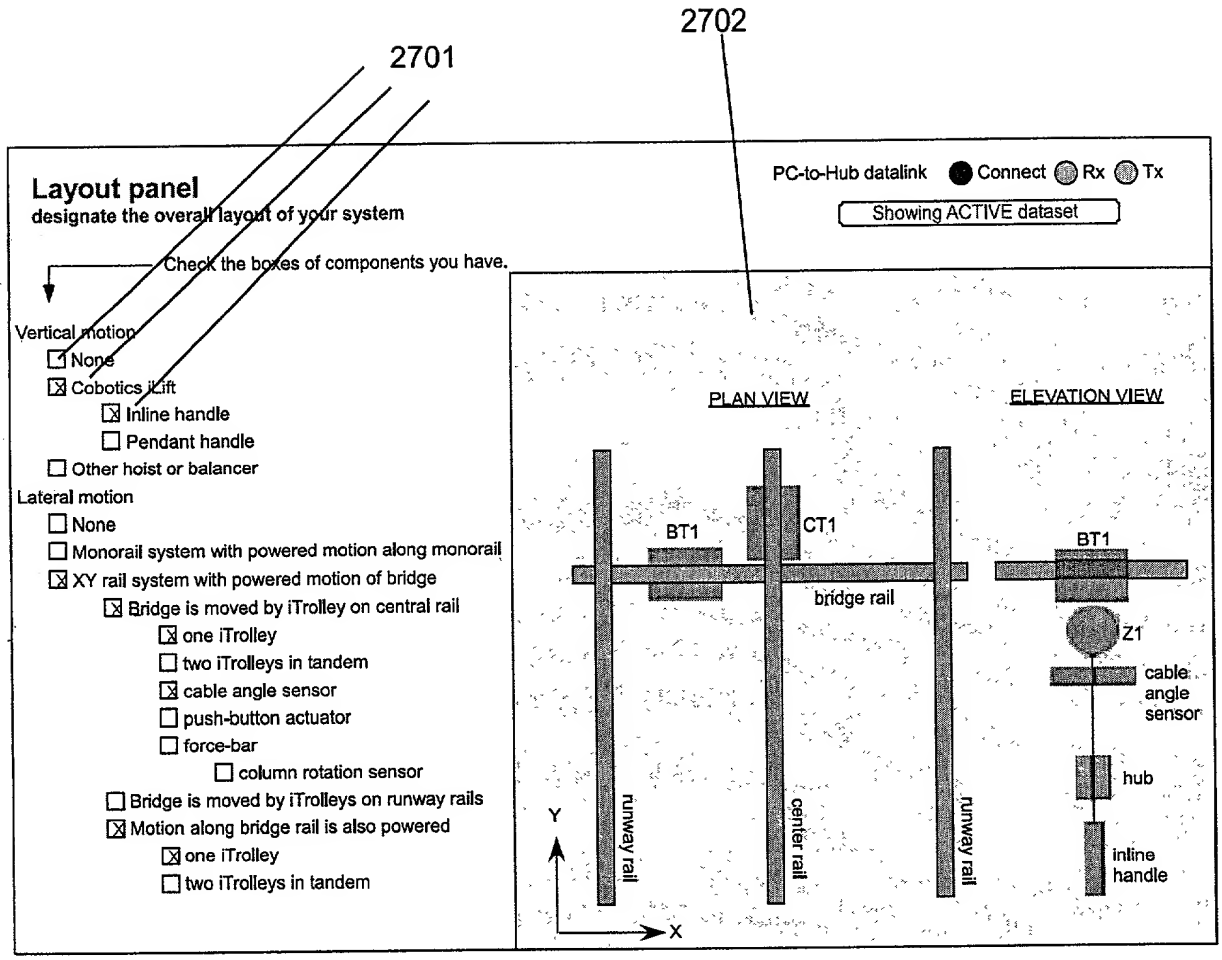
2702
2701
Layout panel
designate the overall layout of your system
Check the boxes of components you have.
PC-to-Hub datalink
Connect
Rx
Tx
Showing ACTIVE dataset
Vertical motion
None
Cobotics iLift
Inline handle
Pendant handle
Other hoist or balancer
Lateral motion
None
Monorail system with powered motion along monorail
XY rail system with powered motion of bridge
Bridge is moved by iTrolley on central rail
one iTrolley
two iTrolleys in tandem
cable angle sensor
push-button actuator
force-bar
column rotation sensor
Bridge is moved by iTrolleys on runway rails
Motion along bridge rail is also powered
one iTrolley
two iTrolleys in tandem
PLAN VIEW
ELEVATION VIEW
BT1
CT1
bridge rail
BT1
Z1
cable angle sensor
hub
inline handle
runway rail
center rail
runway rail
Y
X

Figure 28

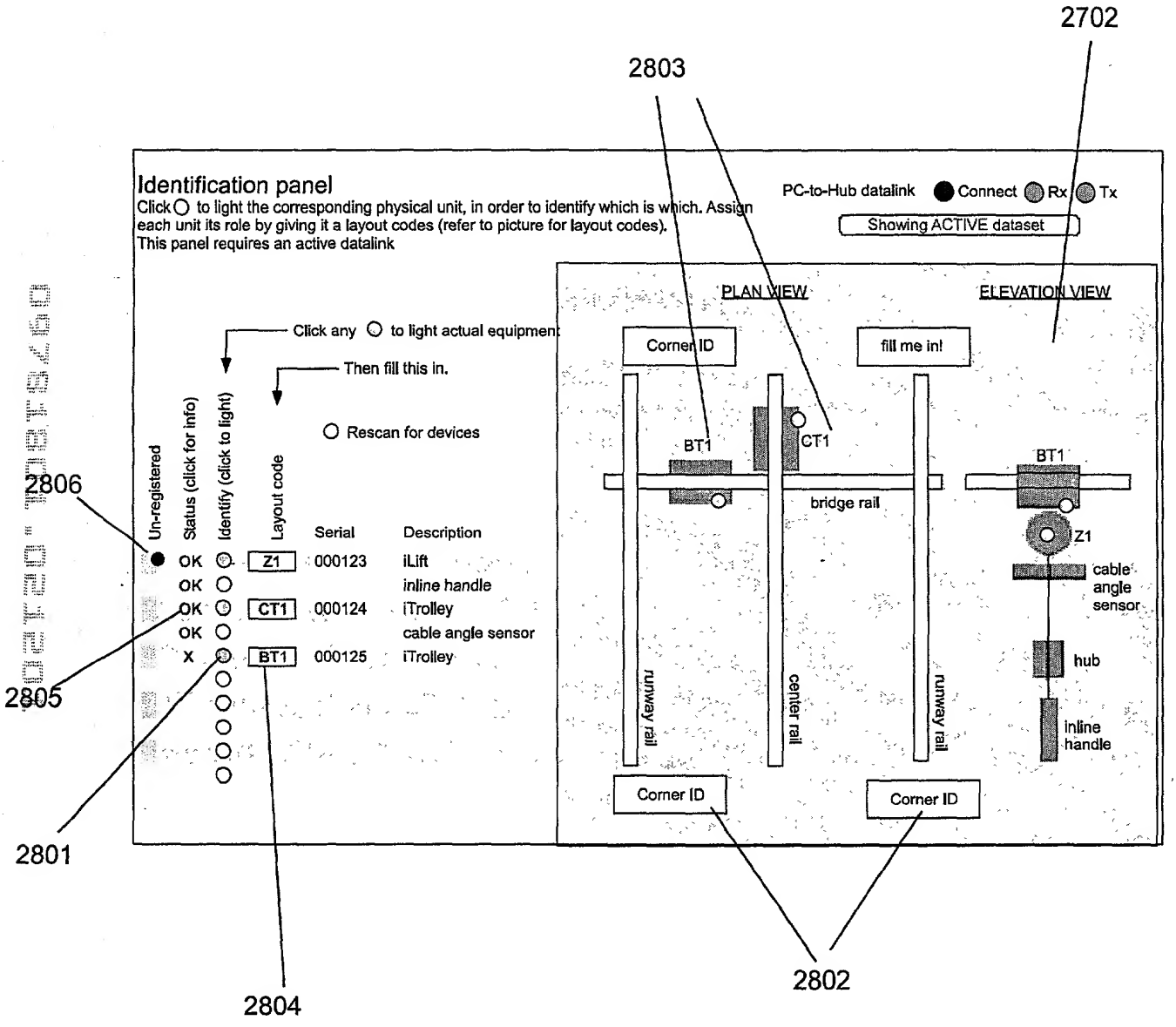
2702
2803
Identification panel
Click ○ to light the corresponding physical unit, in order to identify which is which. Assign each unit its role by giving it a layout codes (refer to picture for layout codes).
This panel requires an active datalink
PC-to-Hub datalink
Connect
Rx
Tx
Showing ACTIVE dataset
PLAN VIEW
ELEVATION VIEW
Click any ○ to light actual equipment
Then fill this in.
○ Rescan for devices
Un-registered
Status (click for info)
Identify (click to light)
Layout code
Serial
Description
OK Z1 000123 iLift
OK inline handle
OK CT1 000124 iTrolley
OK cable angle sensor
X BT1 000125 iTrolley
Corner ID
fill me in!
BT1
CT1
bridge rail
runway rail
center rail
runway rail
Z1
cable angle sensor
hub
inline handle
Corner ID
Corner ID
2806
2805
2801
2804
2802

Figure 29

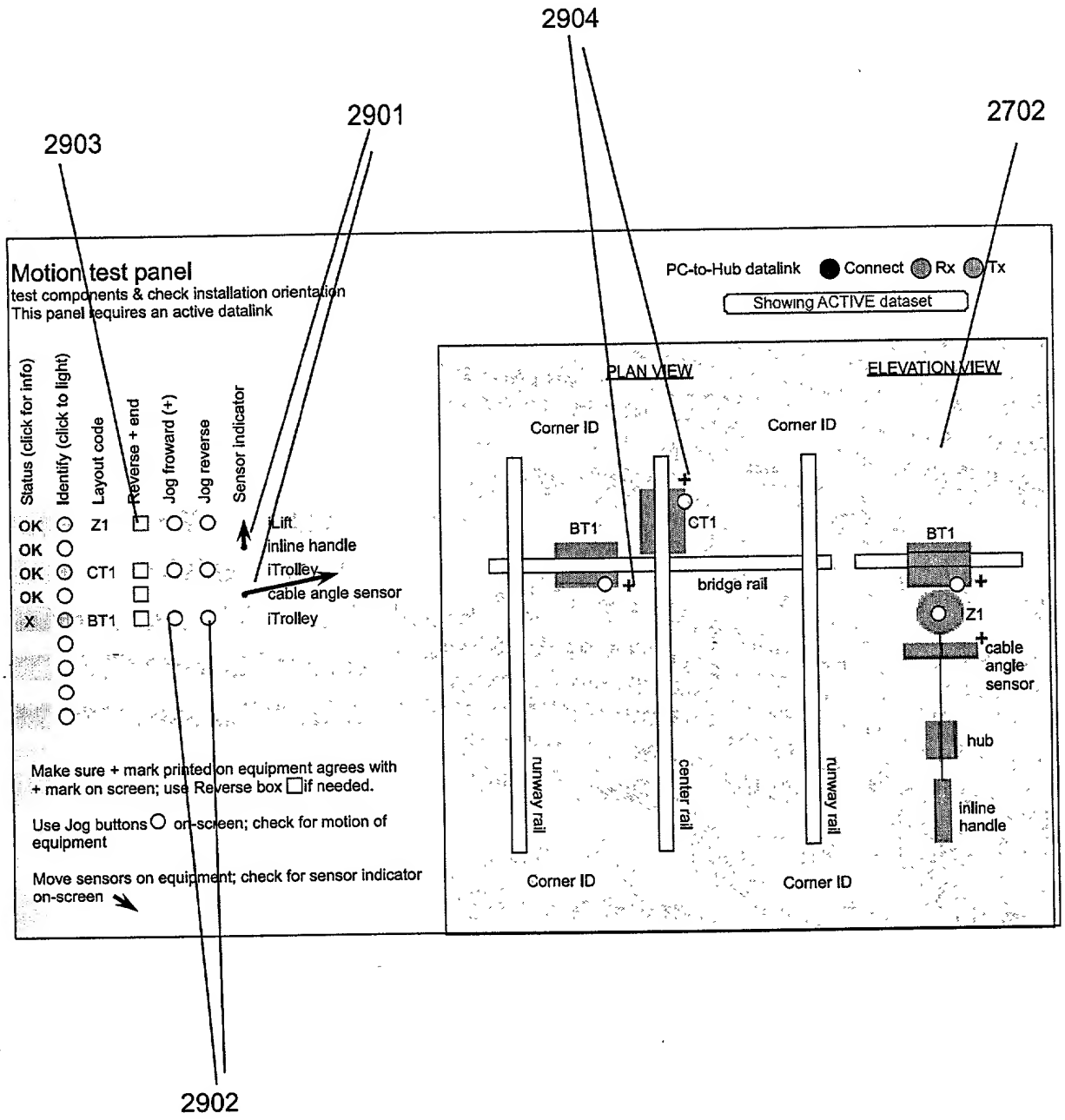
2904
2901
2702
2903
Motion test panel
test components & check installation orientation
This panel requires an active datalink
PC-to-Hub datalink
Connect
Rx
Tx
Showing ACTIVE dataset
Status (click for info)
Identify (click to light)
Layout code
Reverse + end
Jog froward (+)
Jog reverse
Sensor indicator
OK
OK
OK
OK
X
Z1
CT1
BT1
iLift
inline handle
iTrolley
cable angle sensor
iTrolley
Make sure + mark printed on equipment agrees with + mark on screen; use Reverse box ☐ if needed.
Use Jog buttons ○ on-screen; check for motion of equipment
Move sensors on equipment; check for sensor indicator on-screen
PLAN VIEW
ELEVATION VIEW
Corner ID
Corner ID
BT1
CT1
bridge rail
runway rail
center rail
runway rail
Corner ID
Corner ID
BT1
Z1
cable angle sensor
hub
inline handle
2902

Figure 30

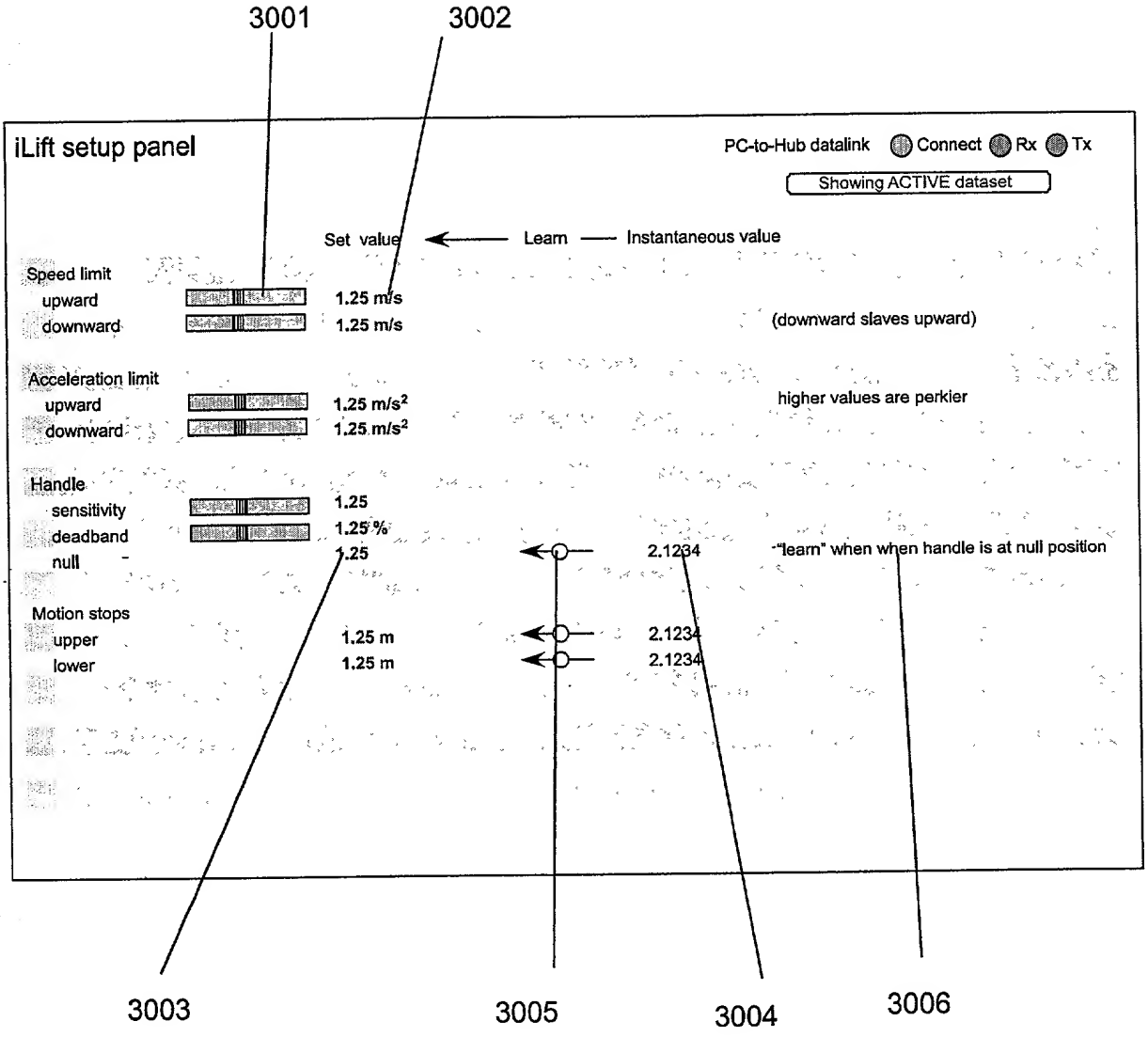
3001
3002
iLift setup panel
PC-to-Hub datalink
Connect
Rx
Tx
Showing ACTIVE dataset
Set value
Learn
Instantaneous value
Speed limit
upward
1.25 m/s
downward
1.25 m/s
(downward slaves upward)
Acceleration limit
upward
1.25 m/s²
downward
1.25 m/s²
higher values are perkier
Handle
sensitivity
1.25
deadband
1.25 %
null
1.25
2.1234
"learn" when when handle is at null position
Motion stops
upper
1.25 m
2.1234
lower
1.25 m
2.1234
3003
3005
3004
3006

Figure 31

3100 {

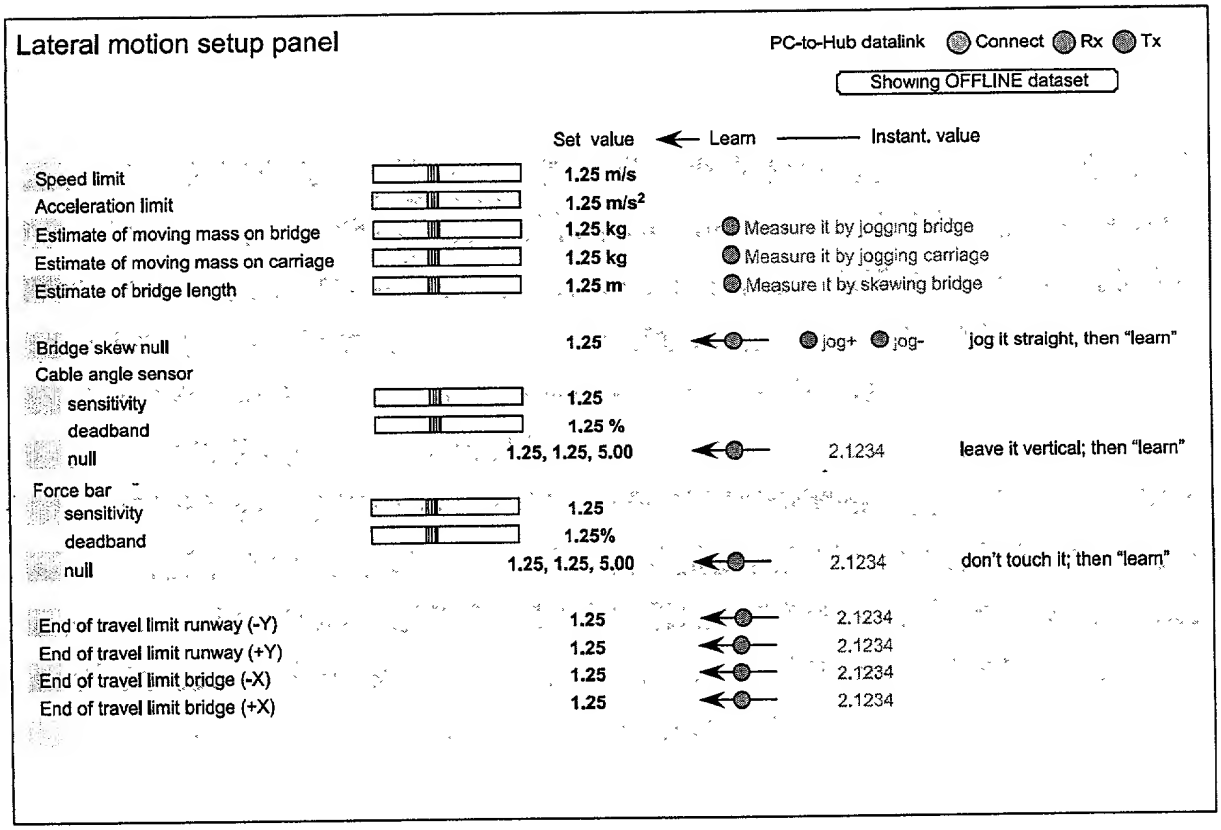

Figure 32

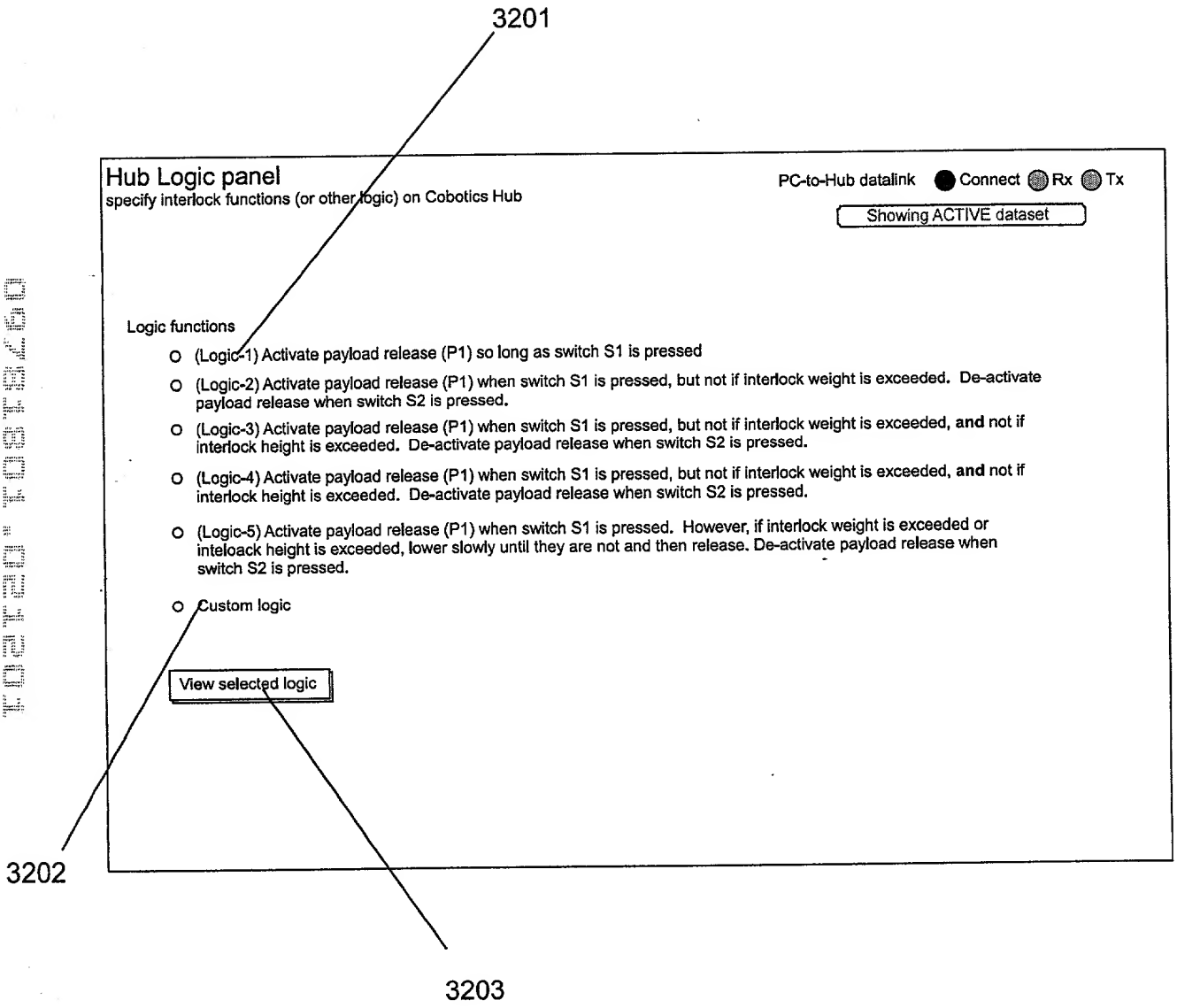
3201
Hub Logic panel
specify interlock functions (or other logic) on Cobotics Hub
PC-to-Hub datalink
Connect
Rx
Tx
Showing ACTIVE dataset
Logic functions
(Logic-1) Activate payload release (P1) so long as switch S1 is pressed
(Logic-2) Activate payload release (P1) when switch S1 is pressed, but not if interlock weight is exceeded. De-activate payload release when switch S2 is pressed.
(Logic-3) Activate payload release (P1) when switch S1 is pressed, but not if interlock weight is exceeded, and not if interlock height is exceeded. De-activate payload release when switch S2 is pressed.
(Logic-4) Activate payload release (P1) when switch S1 is pressed, but not if interlock weight is exceeded, and not if interlock height is exceeded. De-activate payload release when switch S2 is pressed.
(Logic-5) Activate payload release (P1) when switch S1 is pressed. However, if interlock weight is exceeded or inteloack height is exceeded, lower slowly until they are not and then release. De-activate payload release when switch S2 is pressed.
Custom logic
View selected logic
3202
3203

Figure 33

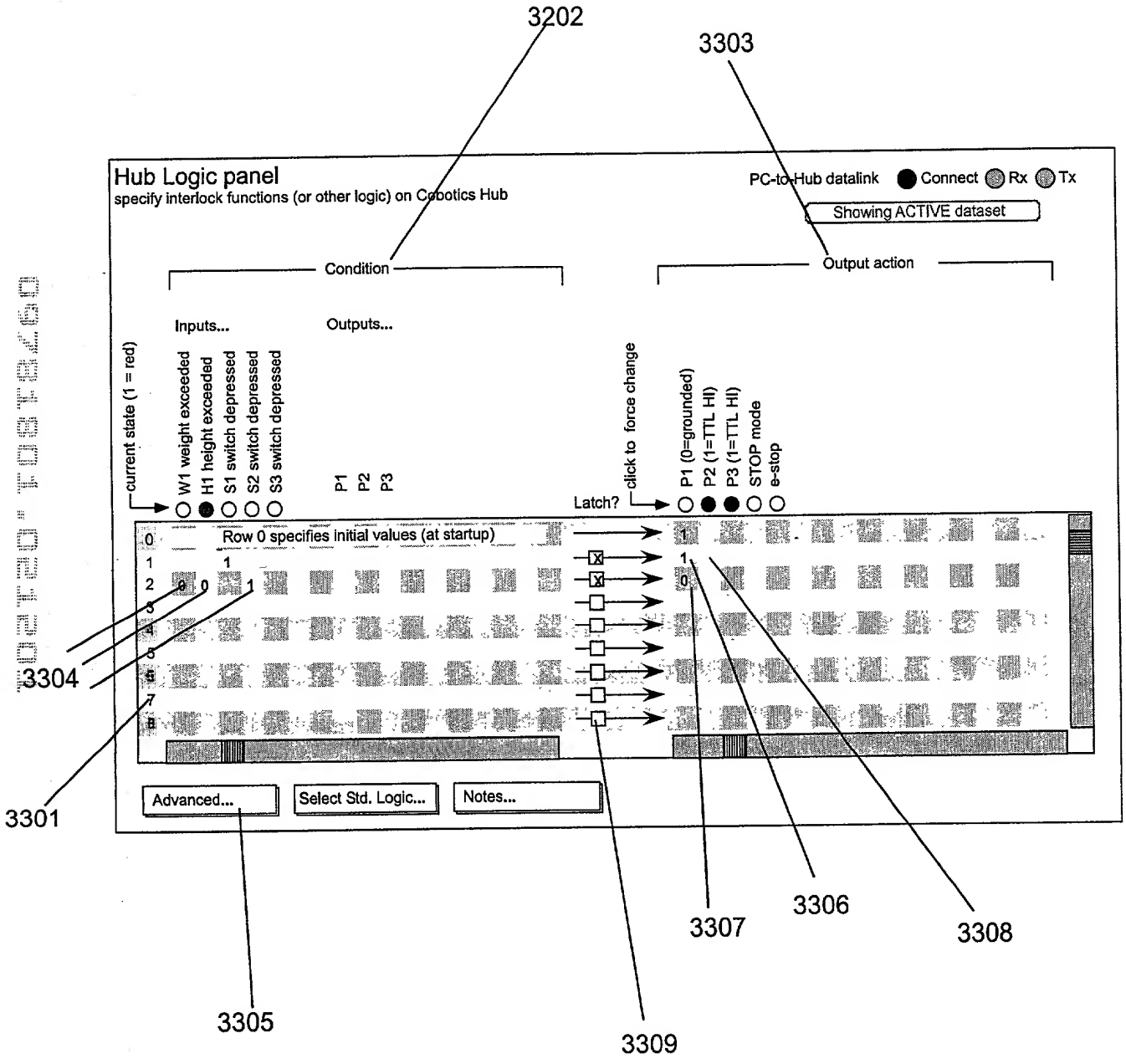
3202
3303
Hub Logic panel
specify interlock functions (or other logic) on Cobotics Hub
PC-to-Hub datalink
Connect
Rx
Tx
Showing ACTIVE dataset
Condition
Output action
Inputs...
Outputs...
current state (1 = red)
W1 weight exceeded
H1 height exceeded
S1 switch depressed
S2 switch depressed
S3 switch depressed
P1
P2
P3
Latch?
click to force change
P1 (0=grounded)
P2 (1=TTL HI)
P3 (1=TTL HI)
STOP mode
e-stop
Row 0 specifies initial values (at startup)
Advanced...
Select Std. Logic...
Notes...
3304
3301
3305
3309
3307
3306
3308

Figure 34

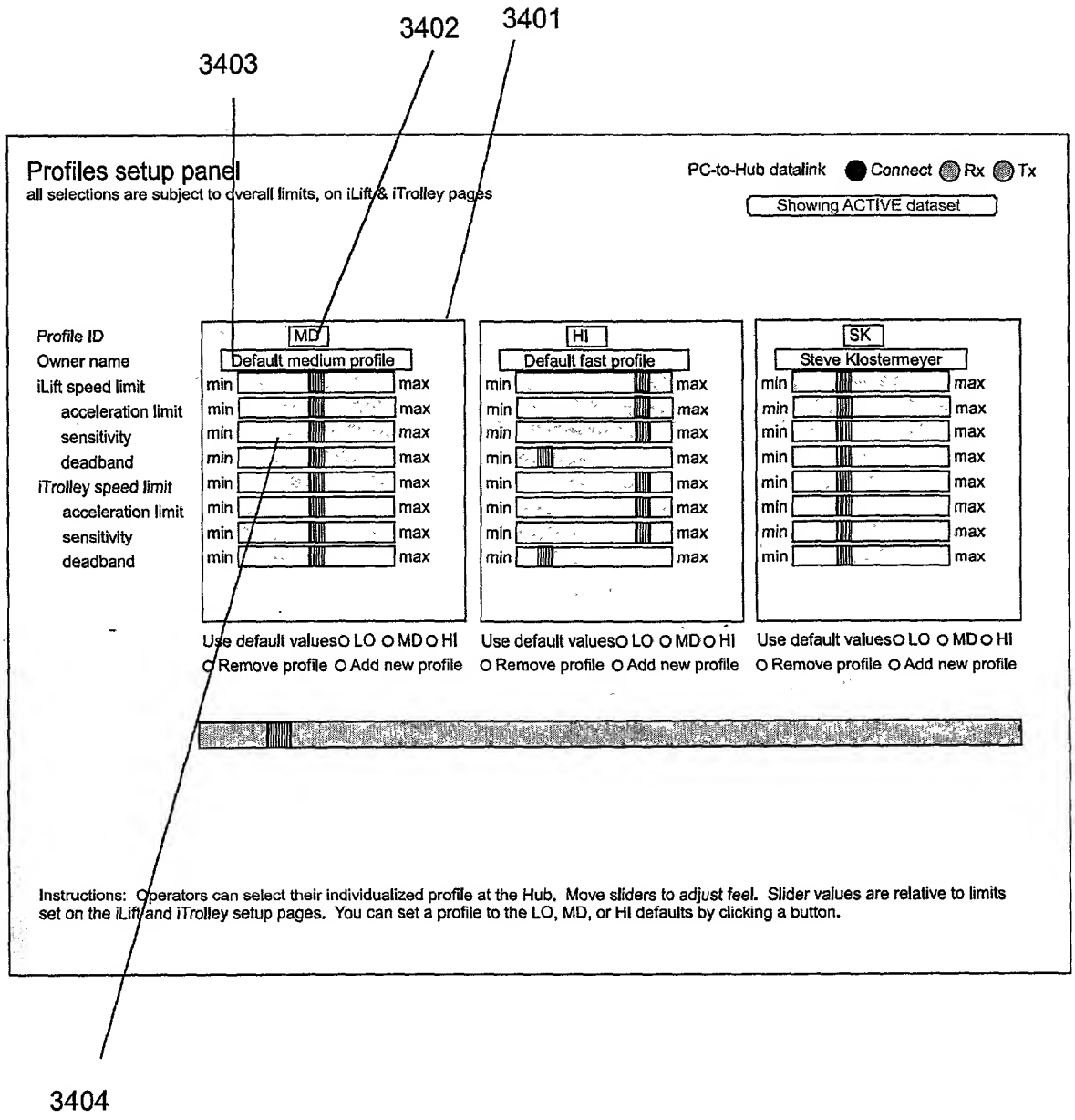
3403
3402
3401
Profiles setup panel
all selections are subject to overall limits, on iLift & iTrolley pages
PC-to-Hub datalink
Connect
Rx
Tx
Showing ACTIVE dataset
Profile ID
Owner name
iLift speed limit
acceleration limit
sensitivity
deadband
iTrolley speed limit
acceleration limit
sensitivity
deadband
MD
Default medium profile
HI
Default fast profile
SK
Steve Klostermeyer
min
max
Use default values LO MD HI
Remove profile
Add new profile
Instructions: Operators can select their individualized profile at the Hub. Move sliders to adjust feel. Slider values are relative to limits set on the iLift and iTrolley setup pages. You can set a profile to the LO, MD, or HI defaults by clicking a button.
3404

Figure 35

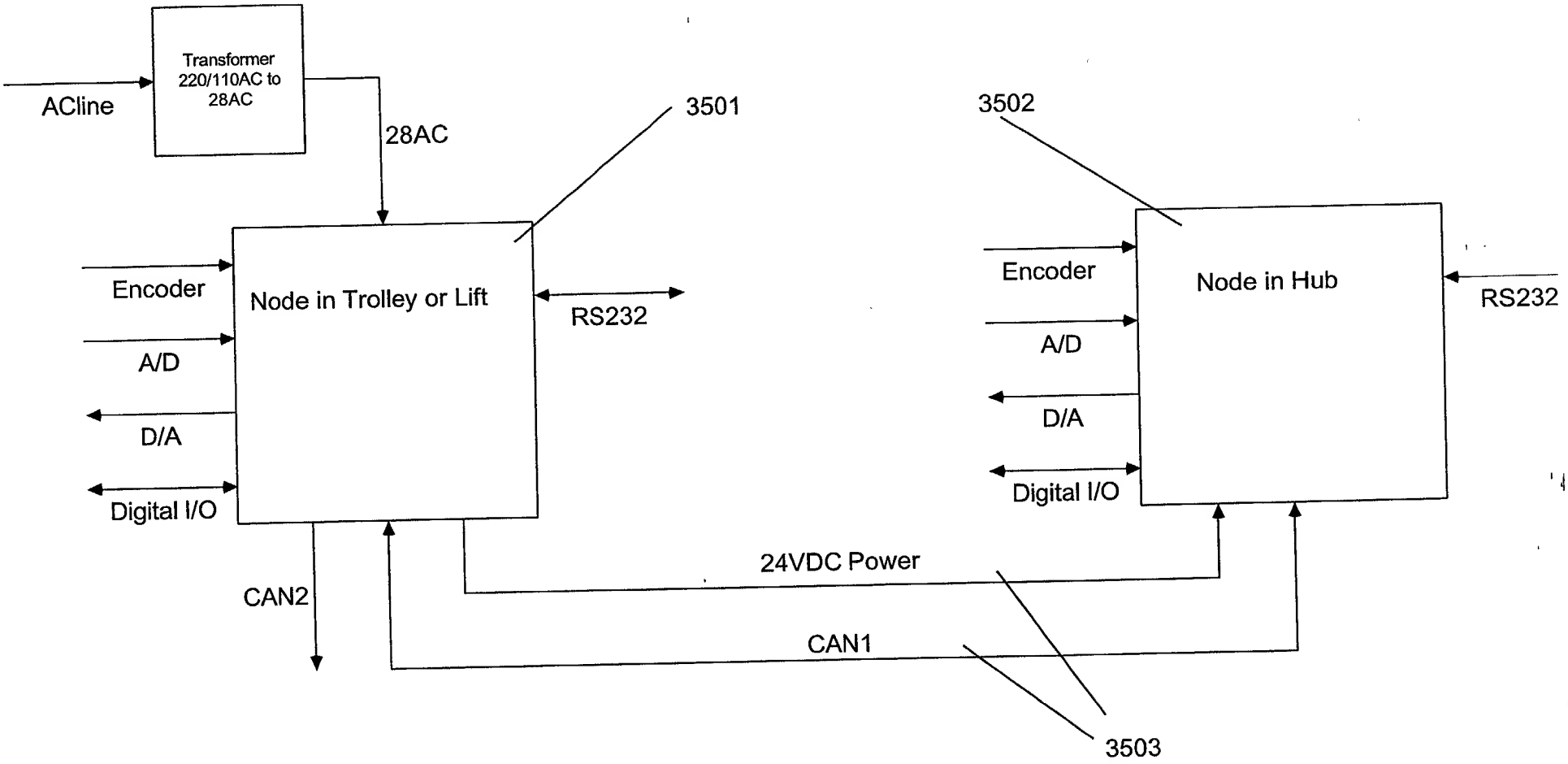
Transformer
220/110AC to
28AC
ACline
28AC
3501
3502
Encoder
Node in Trolley or Lift
RS232
A/D
D/A
Digital I/O
Encoder
Node in Hub
RS232
A/D
D/A
Digital I/O
24VDC Power
CAN2
CAN1
3503

Figure 36

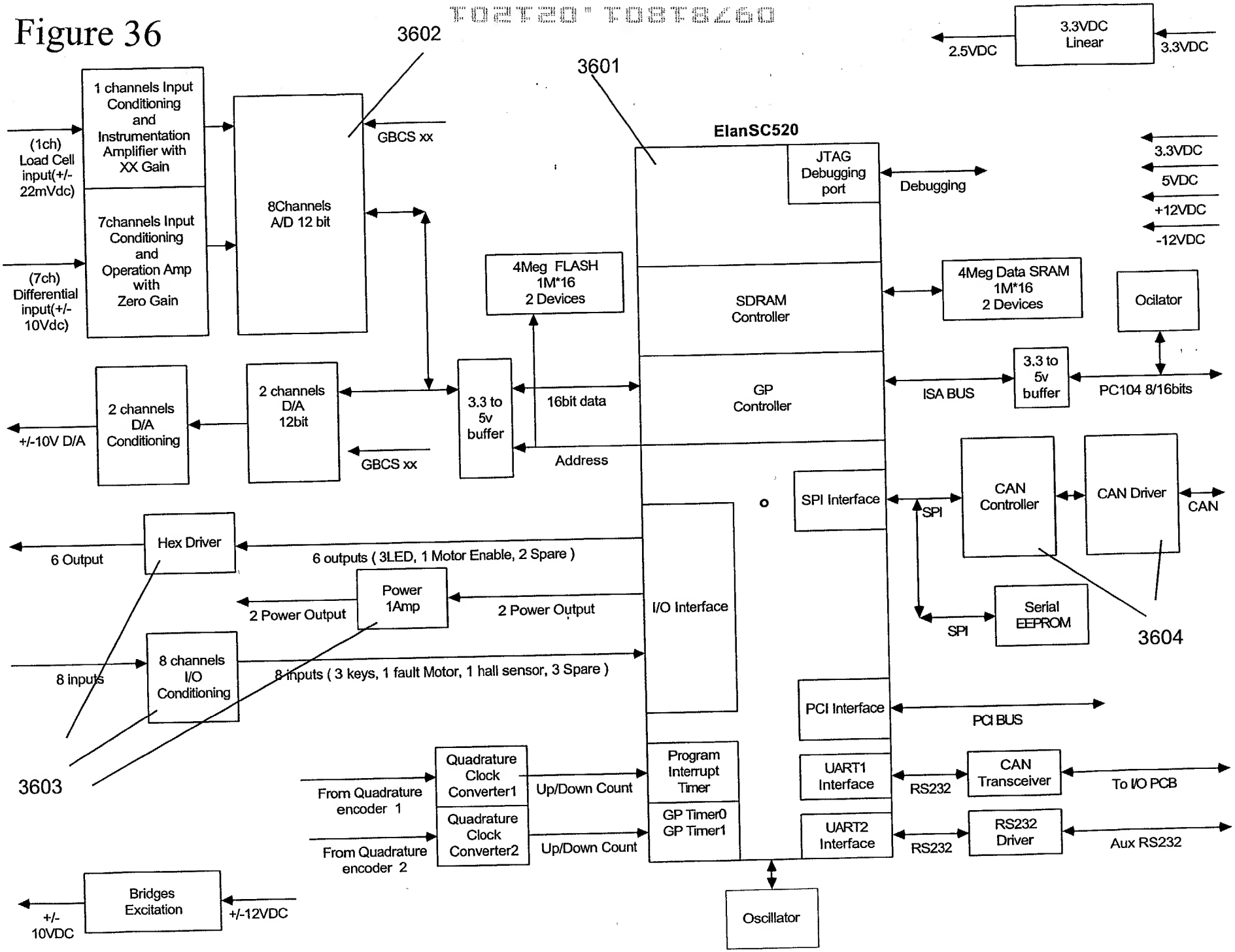
3602
3601
3.3VDC Linear
2.5VDC
3.3VDC
1 channels Input Conditioning and Instrumentation Amplifier with XX Gain
(1ch) Load Cell input(+/- 22mVdc)
7channels Input Conditioning and Operation Amp with Zero Gain
(7ch) Differential input(+/- 10Vdc)
8Channels A/D 12 bit
GBCS xx
ElanSC520
JTAG Debugging port
Debugging
3.3VDC
5VDC
+12VDC
-12VDC
4Meg FLASH 1M*16 2 Devices
SDRAM Controller
4Meg Data SRAM 1M*16 2 Devices
Ocilator
2 channels D/A Conditioning
+/-10V D/A
2 channels D/A 12bit
GBCS xx
3.3 to 5v buffer
16bit data
Address
GP Controller
ISA BUS
3.3 to 5v buffer
PC104 8/16bits
SPI Interface
SPI
CAN Controller
CAN Driver
CAN
Hex Driver
6 Output
6 outputs (3LED, 1 Motor Enable, 2 Spare)
Power 1Amp
2 Power Output
2 Power Output
I/O Interface
Serial EEPROM
SPI
3604
8 inputs
8 channels I/O Conditioning
8 inputs (3 keys, 1 fault Motor, 1 hall sensor, 3 Spare)
3603
PCI Interface
PCI BUS
From Quadrature encoder 1
Quadrature Clock Converter1
Up/Down Count
Program Interrupt Timer
UART1 Interface
RS232
CAN Transceiver
To I/O PCB
From Quadrature encoder 2
Quadrature Clock Converter2
Up/Down Count
GP Timer0
GP Timer1
UART2 Interface
RS232
RS232 Driver
Aux RS232
Bridges Excitation
+/-12VDC
+/- 10VDC
Oscillator

Figure 37

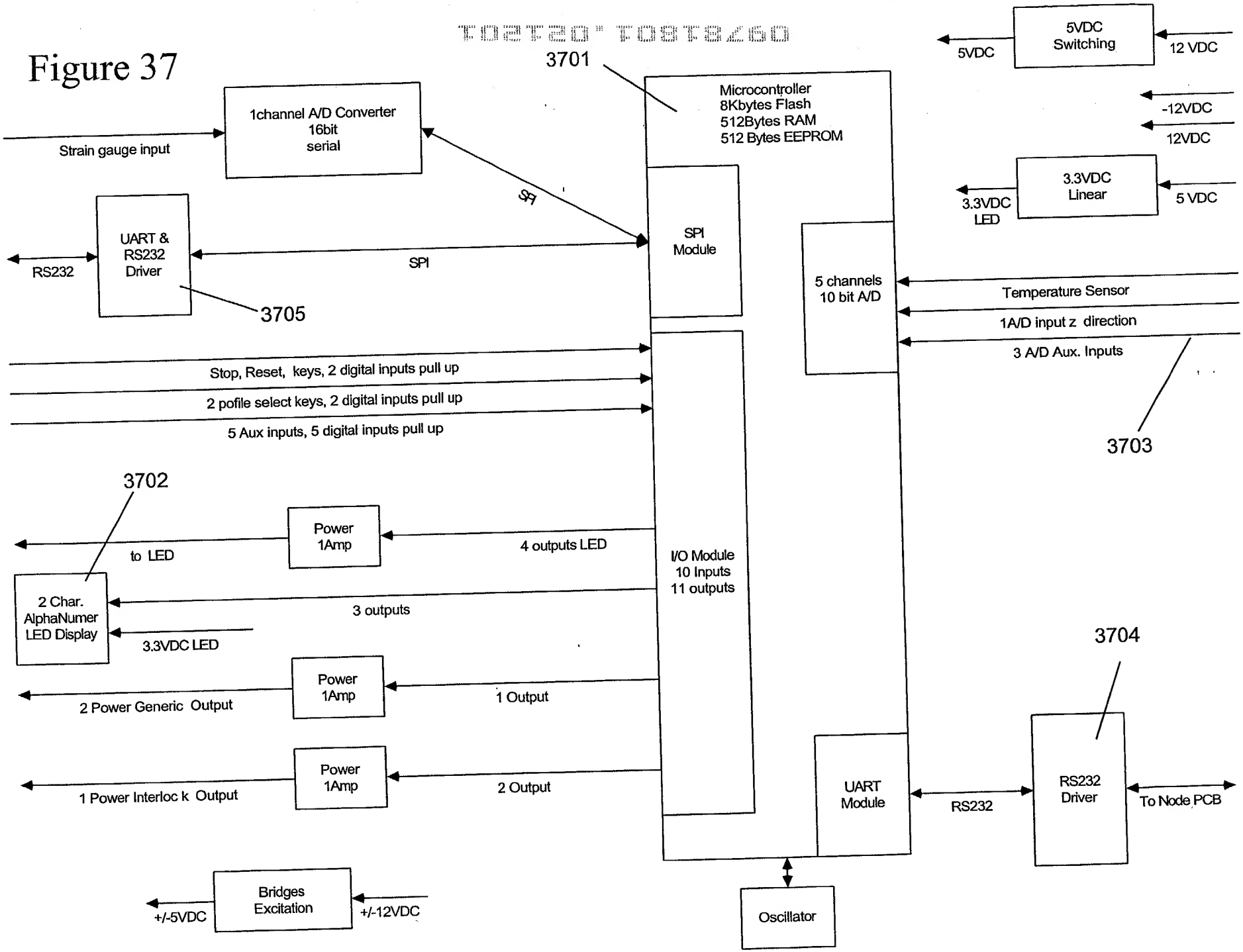
3701
Microcontroller
8Kbytes Flash
512Bytes RAM
512 Bytes EEPROM
1channel A/D Converter
16bit
serial
Strain gauge input
SPI
SPI Module
UART &
RS232
Driver
RS232
SPI
3705
5VDC
Switching
5VDC
12 VDC
-12VDC
12VDC
3.3VDC
Linear
3.3VDC
LED
5 VDC
5 channels
10 bit A/D
Temperature Sensor
1A/D input z direction
3 A/D Aux. Inputs
3703
Stop, Reset, keys, 2 digital inputs pull up
2 pofile select keys, 2 digital inputs pull up
5 Aux inputs, 5 digital inputs pull up
3702
Power
1Amp
to LED
4 outputs LED
I/O Module
10 Inputs
11 outputs
2 Char.
AlphaNumer
LED Display
3 outputs
3.3VDC LED
3704
Power
1Amp
2 Power Generic Output
1 Output
Power
1Amp
1 Power Interloc k Output
2 Output
UART
Module
RS232
RS232
Driver
To Node PCB
Bridges
Excitation
+/-5VDC
+/-12VDC
Oscillator

Figure 38

Field	Size (bytes)	Data Format	Description
SIZE	1	binary	Packet size.
DEVICE_ID	1	binary	Destination device ID.
CMD_TYPE	1	binary	Command type.
DATA	Variable	binary	Actual data associated with the CMD_TYPE field.
CHKSUM	1	binary	Checksum of the packet. This byte equals to the two's complement of the sum of the SIZE, DEVICE_ID, TYPE and DATA, omitting any carry.